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1 **BOWLING BALL RETRIEVING DEVICE**

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4 **Cross – references to Related Applications : None**

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6 **Statement as to right to inventions made under Federally sponsored**

7 **research and development : Not Applicable.**

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10 **Background of the invention:**

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12 **The field of the invention is generally that of a positive contact bowling ball return device**
13 **and more specifically to a convexo – concave ball retrieving apparatus so fabricated as to capture,**
14 **guide, lift and deposit in one smooth continuous flowing motion, a bowling ball for subsequent**
15 **discharge into a bowling ball return. In the bowling industry there are certain mechanical**
16 **malfunctions directly associated with the operation of automatic bowling machinery, these problems**
17 **are most commonly referred to as spinners, Yo-yos and lane stoppages. It is these machinery**
18 **malfunctions that constitute a meaningful overhead cost to the industry, these unnecessary**
19 **problems result in a loss of revenue due to equipment downtime, bowler inconvenience, frustration,**
20 **loss of customer satisfaction and the added cost for providing the personnel whose time would**
21 **be better spent for other maintenance.**

22 **In reference to the Brunswick automatic pinsetter bowling machine, in particular models**
23 **A and A2 which constitute a major percent of the bowling market, the bowling ball automatically**
24 **finds its way for deposit onto the ball return wheel. It is at this time that the malfunction called**

1 spinning occurs. When the large static mass of a round bowling ball, excess oil on the ball and a
2 lack of friction meet a continuously moving ball return wheel, moving at approximately 36 R.P
3 the bowling ball will take the path of least resistance and just sit there and spin. It is this same
4 lack of friction that causes the ball to yo-yo or malfunction in another location of the ball return
5 path. The environment inherent to the operation of automatic bowling equipment is naturally oily,
6 dirty and subject to electrostatics which act in concert to attract even more dirt, it is this oil
7 and dirt that introduces slippage and drag and acts as a deterrent to maintaining a constant
8 friction for a smooth, efficient, trouble free and timely bowling ball return. It will be appreciated
9 by those skilled in the art that to insure that a large mass bowling ball will be return routed,
10 through automatic machinery without slippage or drag, requires a precise amount of applied friction.

11 It is an observation of this inventor that it has been indeed difficult, for manufactures,
12 to achieve and maintain this correct amount of friction due to the constantly changing
13 machine environment of oil and natural wear and the large mass of the ball. Prior art
14 has superficially approached this problem of friction, mass and the phenomena of spin by
15 applying three thin strips of carpet or belting material to the ball return wheel, held in
16 place by adhesives and by increasing the r.p.m. of the automatic machinery. Application of
17 this disposable ball kicker, by prior art, provides inadequate and only temporary friction
18 as the tape very quickly again becomes saturated with oil creating a potential fire hazard,
19 becomes ineffective and must be continuously disposed of in land fills. Typical costs to the
20 operators for three eighteen inch strips of tape per machine, in a fifty-lane bowling alley,
21 could be in excess of two hundred dollars per month and than must be replaced.

22 It will be appreciated by those skilled in the art that this one piece stand alone ball
23 retriever device, having no moving parts, that captures, guides, lifts and deposits in one
24 continuous flowing motion eliminates the need for disposable ball kickers and other ball
25 return aids having moving parts.

26 It will be further appreciated by those skilled in the art that this one piece positive

1 contact device will no longer require the higher machine speed of 36 R.P.M., it can now
2 be operated at approximately 1/3 the R.P.M. thereby reducing the ball wheel revolutions,
3 excessive wear on the guide rollers, flanges, drive belts, bearings, pulleys, reducing ball and
4 pin damage, extend machinery life and will result in an overall energy savings. It is another
5 observation of this inventor that the ball lift rods will no longer have to be manufactured
6 with a rubber coating to provide friction as the lead guide finger of this device capture
7 and holds the ball in a concave radius, applying a constant pressure against the back ball
8 lift rod. It is a further observation of this inventor that due to the ball retriever one piece
9 simplicity it could ultimately be incorporated into the manufactures fabrication of the ball
10 return wheel.

1 SUMMARY OF THE INVENTION :

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3 The present invention is a one piece structure having no moving parts that when
4 secured to the ball return wheel captures, guides, lifts and deposits in one smooth continuous
5 flowing motion, a bowling ball for subsequent discharge into a bowling ball return.
6 This positive action device provides the integrity of a constant friction against a bowling
7 ball on its return path through automatic bowling machinery, it being impervious to
8 slippage caused by lubricants and drag caused by dust and dirt. This device eliminates the
9 need for disposable ball kickers and other ball return aids having moving parts and allows
10 the automatic machinery to be operated at a lower r.p.m. thereby extending machinery
11 lifetime and for a savings of energy.

12 It is an object of the invention to provide the user a device that reduces automatic
13 bowling machinery downtime and a subsequent loss of revenue by eliminating spinners
14 and ball hang-ups regardless of how much oil is on the ball.

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16 It is another object of the invention to provide the user a one piece device, having no
17 moving parts, that eliminates the need for disposable ball kickers and other ball return aids
18 having moveable components.

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20 It is a further object of the invention to provide the user a more environmentally
21 friendly device that eliminates the need for the disposal of oil soaked rubber ball kickers
22 and carpet strips into land fill areas.

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24 It is another object of the invention to provide the user safer operation of automatic
25 bowling machinery by eliminating a potential fire hazard posed by the presence of oil
26 saturated kicker strips.

1 It is a further object of the invention to provide the user a device that reduces the
2 excessive wear on automatic bowling machinery such as bearings, guides, belts and drives
3 by allowing the user to operate the equipment at a lower r.p.m.

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5 It is another object of the invention to provide the user a more energy efficient
6 operating system by allowing them to operate at a lower r.p.m.

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8 It is a another object of the invention to provide the user a device that reduces
9 bowling ball and pin damage by allowing them to operate at a slower r.p.m.

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11 It is a further object of the invention to provide the user a device that helps speed
12 bowling pins on the rear of the pit conveyor into the pin elevator thereby reducing
13 the setup time of bowling pins.

14

15 It is a further object of the invention to provide the user a device that eliminates
16 the expense and danger of using hazardous cleaning materials and eliminates the time
17 required by a mechanic to clean the ball return wheel.

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19 It is another object of the invention to provide the user a device that reduces mechanical
20 downtime thereby saving the expense of replacing expensive bearings on rollers and pulleys.

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22 It is a further object of the invention to provide the user a field upgrade kit to slow
23 down the automatic bowling machinery to facilitate smoother operation and provide longer
24 machinery lifetimes.

1 Further objects are implicit in the detailed descriptions which follows hereinafter (which
2 is to be considered as exemplary of, but not specifically limiting, the present invention)
3 and said objects will be apparent to persons skilled in the art after a careful study of the
4 detailed descriptions which follows.

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6 For the purpose of clarifying the nature of the present invention , one exemplary
7 embodiment of the invention is illustrated in the hereinbelow-described figures of the
8 accompanying drawing and is described in detail hereinafter. It is to be taken as representative
9 of the multiple embodiments of the invention which lie within the scope of the invention.

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1 BRIEF DESCRIPTION OF THE DRAWINGS :

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3 Fig. 1 is a perspective view showing one exemplary embodiment of one representative
4 form of the invention.

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6 Fig. 2 is a perspective view showing one exemplary embodiment of one representative
7 form of the invention.

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9 Fig. 3 is another perspective view showing one exemplary embodiment of one
10 representative form of the invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS :

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3 Referring to Fig. 1. Bowling ball retriever 1 is a positive contact singularity base , that
4 is to say, it is a one piece contact device having no moving parts. Ball retriever
5 1 is secured to the ball return wheel 6 with pop rivets 2, however other means of
6 securing or fastening may also be used. The bottom 7 of ball retriever 1 is configured
7 convex to physically comply with the inside radius of the ball return wheel 8, however
8 that is not to say that another bottom configuration could be used if required by
9 another form of fastening. The lead guide finger 9 of retriever 1 is designed to retrieve
10 the ball, differentiating between ball and pin, to guide, capture and house the ball
11 in its concave leading edge 10 for lift and delivery for subsequent discharge into a ball
12 return. The ball, held in the radius of the lead guide finger 11 applies the correct
13 amount of pressure against the back ball lift rod 12 eliminating the need for the rubber
14 friction compensator. The leading edge 13 of ball retriever 1 is of a particular radius,
15 however, other shapes or radii could also be used. The top trailing edge 14 of ball
16 retriever 1 is of a angle for easy deposit of the ball into the ball return at the top of
17 the ball lift, however another shape or angle could also be used. Ball retriever 1
18 eliminates the need for the manufacture to friction compensate the ball return system
19 by operating at 36 r.p.m, this inventor suggests that the bowling machinery be now
20 operated at a lower r.p.m. by using belt and pulley reduction, however, other means
21 of speed reduction may also be used. Elongated front angled edge 3 expedites the
22 separation of the bowling ball and bowling pins for a faster ball return system. The
23 second angle top rear 4 facilitates easier discharge of bowling ball onto the ball
24 return rails 15. Recess 5 secures the bowling ball for delivery to the ball return
25 rails 15. Impact cushion 16 is attached to the impact sides of ball retriever 1 with adhesives
26 however that is not to say that other means of fastening may also be used, the function of

- 1 impact cushion 16 is to assist in diverting the ball and to lesson the stress placed on the
- 2 fasteners 2 used to attach the ball retriever device1 to the ball return wheel 6. Ball protector
- 3 lip 17 insures against ball damage due to occasional high speed impact, ball protector
- 4 lip 17 is shaped by the forming process of ball retriever 1, however other means of
- 5 ball protection may also be used. One or more impact cushions (16) or other configurations
- 6 and compositions may also be used however that is not to say that other means of bowling
- 7 ball protection may also be used.
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